What is claimed is:

1.A method for fabricating ZnO nanostructures from Zn gas, which is produced by a reduction process between ZnO powder and graphite, on a silicon substrate, wherein said reduction process is performed at 800 - 950 °C in the presence of a gas mixture where oxygen content is 1-20 vol % with reference to that of argon gas.

2. The method for fabricating ZnO nanostructures according to claim 1, wherein said argon gas is introduced into a reaction tube at the rate of 20-50 cc/min.

3. The method for fabricating ZnO nanostructures according to claim 1, wherein said silicon substrate is coated with gold to be 10-30 angstrom (Å) thick.

4. The method for fabricating ZnO nanostructures according to claim 1, wherein nanowires are fabricated in the condition where a reaction temperature is 800 - 850 °C, argon gas is introduced into a reaction tube at the rate of 20-50 cc/min, and oxygen content in the gas mixture is 1-20 vol % with reference to that of argon gas.

5. The method for fabricating ZnO nanostructures according to claim 4, wherein said nanowires are 50-200 nm in diameter and 5-100 μm in length.

6. The method for fabricating ZnO nanostructures according to claim 1, wherein nanowire arrays are fabricated in the condition where a reaction temperature is

850 - 900 °C, argon gas is introduced into a reaction tube at the rate of 20-50 cc/min, and oxygen content in the gas mixture is 1-2 vol % with reference to that of argon gas.

7. The method for fabricating ZnO nanostructures according to claim 6, wherein said nanowire arrays are of a comb shape and 10-50 μm in width, 50-1000 μm in length and 50-300 nm in diameter.

8. The method for fabricating ZnO nanostructures according to claim 1, wherein nanosheets are fabricated in the condition where a reaction temperature is 850 - 900 °C, argon gas is introduced into a reaction tube at the rate of 20-50 cc/min, and oxygen content in the gas mixture is 2-20 vol % with reference to that of argon gas.

9. The method for fabricating ZnO nanostructures according to claim 8, wherein said nanosheets are 10-100 μm in width, 500-2000 μm in length and 50-150 nm in diameter.

10. The method for fabricating ZnO nanostructures according to claim 1, wherein nanorods are fabricated in the condition where a reaction temperature is 900 - 950 °C, argon gas is introduced into a reaction tube at the rate of 20-50 cc/min, and oxygen content in the gas mixture is 1-8 vol % with reference to that of argon gas.

11. The method for fabricating ZnO nanostructures according to claim 1, wherein nanoplates are fabricated in the condition where a reaction temperature is 900 - 950 °C, argon gas is introduced into a reaction tube at the rate of 20-50 cc/min, and oxygen content in the gas mixture is 8-20 vol % with reference to that of argon gas.

12. An apparatus for fabricating ZnO nanostructures comprising:

a heating element which maintains the internal temperature of a reaction tube at 800 - 950 °C for heating a substrate and source materials within the reaction tube;

a reaction tube for distribution of source material and a substrate which horizontally passes through the interior of the heating element while being positioned inside the heating element, wherein a gas inlet and a gas outlet for the introduction and release of a carrier gas, respectively, are located at each end of the reaction tube; and

a reactant which, being positioned inside the reaction tube, receives the source materials and the substrate.

13. An apparatus for fabricating ZnO nanostructures according to claim 12, wherein said reactant, while its upper portion is laid open, comprises a boat of a rectangular shape where a certain amount of source materials and a substrate are to be contained; source materials and a substrate which are to be contained in said boat; and a plurality of substrates which are spanned at regular intervals over said boat in the direction of the width of said boat.

14. The apparatus for fabricating ZnO nanostructures according to claim 12, wherein said substrates are separated from the source materials to the extent of 3-10 mm in a vertical direction.

15. The apparatus for fabricating ZnO nanostructures according to claim 12 or claim 14, wherein said substrates are coated with gold on top of said silicon substrates to be 10-30 angstrom (Å) thick.

16. The apparatus for fabricating ZnO nanostructures according to claim 12, wherein said substrates and said source materials are placed about 0-50 mm apart from the center of said reaction tube toward the outlet of the carrier gas.